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AUTHOR Matuszek, Paula A.; Oakland, Thomas D.
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ABSTRACT

First grade students stratified on the basis of their racial-ethnic and socioeconomic status (SES) were studied to determine factors measured by several readiness (aptitude) tests and to learn whether these factors differed for the children from the various groups. SES was determined by father's occupation, or if absent, mother's occupation; the identification of racial-ethnic backgrounds was left to the teacher. Six groups of children were finally chosen: middle and lower class Blacks, Mexican-Americans, and Anglo-Americans. The major observation drawn from the data was that factors derived from the tests differed markedly across groups. It was further concluded that present tests were inefficient in that several subtests seemed to measure the same factors. Data also indicated that tests could not be used interchangeably with children from different SES and racial-ethnic backgrounds. (Two tables of factor loadings and a reference list are appended.) (HS)

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A Factor Analysis of Several Reading Readiness Measures for Different Socioeconomic and Ethnic Groups

Paula A. Matuszek and Thomas D. Oakland
The University of Texas at Austin

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During the past decade psychologists have become increasingly concerned with examining the characteristics of educational and psychological tests, particularly those used extensively with minority group children. Much interest has been focused on attempts to more fully validate existing instruments so as to examine the extent to which a test measures what it claims to measure (Bennett, 1970, Brazziel, 1970; Brown, 1970; Manning, 1968; Messick & Anderson, 1970; Thorndike, 1971; Yourman, 1970). Although many tests appear to be unfair or discriminatory to minority group children, there is very little agreement as to what can be done about it.

A number of solutions have been proposed. One proposed solution was to create a general moratorium on testing (Brazziel, 1970; Cameron, 1970). This suggestion generally is viewed as being simplistic and negates the needs of teachers and others who want some type of information to assist them in making decisions about children. Another alternative, educating test consumers to use tests and test information more appropriately (Messick & Anderson, 1970; Sommer, 1970), usually is accepted as a necessary but incomplete step. Others have suggested devising tests which use separate regression equations to generate comparable scores for different racial groups (Darlington, 1971) or to establish cut-off levels to admit applicants in the same proportion as successes to failures occur in the admitted group of that race (Thorndike, 1971). An approach which seems particularly viable is one based on using factor analytic techniques to investigate the characteristics of present tests in an attempt to examine relevant psychometric paramesters and to attempt to create more sophisticated instruments.

When an educational or psychological test is administered to a heterogeneous group, one normally assumes that the test is measuring the same ability, construct, or trait among all persons irrespective of their

racial-ethnic group or their social class. When this assumption is tested and not supported, then we need to seriously consider restricting the use of the test instrument.

For example, Leventhal and Stedman (1970) examined the factorial structures of the ITPA for white and Negro children through the use of factor analytic techniques. Their results indicate that somewhat distinct factors are apparent for the two groups of children; this suggests that the abilities measured by the ITPA are somewhat different for the two groups. Similar studies have been conducted on other tests (Lennon, 1962; Manning, 1968). In their attempt to explore whether the tests measure same construct for different groups of children, these studies also support the notion that one instrument may be measuring dissimilar abilities or constructs in children of different racial-ethnic or socio-economic (SES) groups.

The objectives of the present study were (1) to determine the factors measured by several readiness (aptitude) tests and (2) to examine whether those factors differed for children from different racial-ethnic and SES groups.

METHOD

Students entering first grade for the first time were stratified on the basis of SES and racial-ethnic background. Using the Warner, Meeker, Eels scale, SES was determined on the basis of father's occupation or, if the father was absent from the home, mother's occupation. Teacher classification identified the racial-ethnic background of the children. Six groups of children were chosen: middle and lower class Black, middle and lower class Mexican-American, and middle and lower class Anglo. The

following readiness tests were administered to children within each of these six groups: the Clymer-Barrett Prereading Battery (CB), the Tests of Basic Experiences: Language (TOBE-L) and General Concepts (TOBE-C); the Slosson Intelligence Test (SIT); the Slosson Oral Reading Test (SORT); and the Metropolitan Readiness Test (MRT). Separate factor analyses, using a varimax rotation analysis, were performed on each group of children. Factors were extracted until the matrix being factored had an eigenvalue smaller than 1.0.

Results

Data pertaining to the entire group will be considered first (Table 1).

Considering first the data from the MRT and the TOBE, two factors were apparent. One factor (accounting for 24% of the variance) appears to be a measure of verbal ability (MRT Word Meaning and TOBE-L) and the other factor (accounting for 43% of the variance) is composed of all other measures not included within the first factor.

The analysis of the MRT and the Slosson data also yields two factors. One factor (accounting for 27% of the variance) seems to be measuring verbal ability (MRT Word Meaning and the SIT MA and IQ) and the other factor (accounting for 38% of the variance) was highly weighted on all other MRT subtests and the SORT.

Two factors again were noted among the data for the MRT and the CB. One factor (accounting for 27% of the variance) is composed of the MRT subtests--with the exception of Word Meaning; the other factor (accounting for 28% of the variance) composed of the CB subtests.

The results of analyses conducted for each of the six groups are presented in Table 2.

The most outstanding observation from these analyses is that the same tests measure different factors within each of six separate racial-

ethnic and SES groups. The analyses did not show any factors common to groups of the same SES or groups of the same racial-ethnic background. Rather, different factors were apparent for each of the six groups. For example, the SIT formed a separate factor for the Black middle-class group, combined with the MRT Word Meaning subtest for the Black lower-class group, combined with the MRT Word Meaning, Listening, Matching, and numbers subtests for the Mexican-American middle class group, combined with the MRT Listening subtest for the Mexican-American lower class group, combined with the MRT Word Meaning subtest for the Anglo middle class group, and combined with the MRT Numbers subtest for the lower-class Anglo group.

There is little evidence for distinct test factors within any group. Although both TOBE subtests usually occur in the same factor, other subtests also occur within that factor; thus, that factor cannot be attributed solely to the TOBE. The same is true for the SIT MA and IQ scores which always occur together but in a factor including other subtests. The subtests of the CB usually do not all occur within one factor; the subtests of the MRT also are divided among two or more factors.

It is interesting to note that no separate factors were apparent for those tests which are administered to groups as opposed to those tests which are administered to groups as opposed to those tests which are administered individually.

Discussion

One major conclusion that can be drawn from the data is that the factors derived from these readiness tests differ markedly across racial-ethnic and SES groups. Therefore, the assumption that these readiness tests assess common abilities among children who differ in terms of SES or ethnicity is not tenable.

This has widespread implication for school systems which use the tests.

The present data indicate that the tests cannot be used interchangeably with children from different racial-ethnic and SES backgrounds. Therefore, before schools can use tests with confidence, further research is needed to establish the differential predictive validity and other psychometric characteristics of these measures and to develop tests which can be used interchangeably with children from different racial-ethnic and SES groups.

The other major conclusion is that present tests are inefficient in that several subtests seem to measure the same factor. When this occurs, there is little information to be gained by giving all of the subtests rather than just one. Further research also is needed to determine which abilities actually are measured by these clusters of tests and which tests or subtests provide the most efficient method of testing relevant abilities.

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Table 1
Factor Loadings for Total Group

	Metropolitan Readiness Test & Slosson		Metropolitan Readiness Test & Clymer-Barrett		Metropolitan Readiness Test and Test or Basic Experiences	
Metropolitan Reading Test	1	2	1	2	1	2
Word Meaning	.02	-.87	.19	.29	.08	.92
Listening	.61	-.13	.01	.74	.70	.01
Matching	.75	-.16	.28	.73	.78	.16
Alphabet	.80	-.18	.40	.66	.76	.04
Numbers	.80	-.25	.18	.84	.84	.11
Copy	.68	-.17	.42	.53	.62	.26
Test of Basic Experiences						
Language					.21	.93
Concepts					.76	.29
Clymer-Barrett						
LetterRecognition			.64	.39		
Word Matching			.69	.31		
Beginning Sounds			.68	.27		
Ending Sounds			.49	.45		
Shape Completion			.79	.17		
Copy			.80	.04		
Slosson						
MA (SIT)	.45	-.83				
IQ (SIT)	.37	-.85				
Oral Reading Test	.60	-.22				

Table 2
Factor Loadings Greater than .6 for all Ethnic-Racial and SES Groups

	Metropolitan Readiness Test and Clymer-Barrett	Metropolitan Readiness Test and Slosson	Metropolitan Readiness Test and Test of Basic Experiences
Black-Middle	1. MRT alphabet and copy; C-B letter recognition. 2. C-B beginning sounds and ending sounds. 3. C-B word match, shape completion, and copy. 4. MRT listening and matching. 5. MRT word meaning.	1. MRT listening, matching, alphabet, and numbers. 2. SIT MA & IQ 3. MRT word meaning and copying; SORT.	1. MRT listening, matching, alphabet, and numbers. 2. MRT word meaning; TOBE language and concepts.
Black-Lower	1. All C-B subtests. 2. MRT listening, matching alphabet and numbers 3. MRT word meaning.	1. MRT listening, matching, alphabet, numbers and copying; SORT. 2. MRT word meaning; SIT MA & IQ.	1. MRT listening, matching, alphabet and numbers; 2. MRT word meaning; TOBE language.
Mexican-American Middle	1. MRT listening and numbers; C-B word matching and ending sounds. 2. MRT alphabet; C-B letter recognition. 3. MRT word meaning; C-B beginning sounds and copy.	1. MRT word meaning, listening, matching, and numbers; SIT MA & IQ 2. MRT alphabet; SIT IQ and SORT	1. MRT matching and numbers; TOBE language and concepts. 2. MRT word meaning and listening.
Mexican-American Lower	1. MRT alphabet and numbers 2. C-B letter recog., beginning & ending sounds. 2. MRT copy; C-B shape completion and copy. 3. MRT word meaning.	1. MRT alphabet, numbers and copy; SORT 2. MRT listening; SIT MA & IQ. 3. MRT word meaning	1. MRT matching, alphabet, numbers, and copy. 2. TOBE language and concepts.
Anglo-Middle	1. MRT copy; C-B word matching, beginning sounds, ending sounds, and shape completion. 2. MRT word meaning, listening, alphabet and numbers; C-B letter recognition.	1. MRT word meaning, listening, matching, and numbers. 2. MRT word meaning; SIT MA & IQ 3. MRT numbers; SORT.	1. MRT word meaning, listening, matching, alphabet and numbers; TOBE language and concepts. 2. MRT copy.
Anglo-Lower	1. MRT alphabet and numbers; C-B letter recognition. 2. C-B word matching, shape completion and copy. 3. C-B beginning and ending sounds. 4. MRT listening and matching.	1. MRT numbers; SIT MA & IQ. 2. MRT word meaning, listening, matching, and copy. 3. SORT.	1. extracted only one factor which loaded on all subtests.